FIG. 1

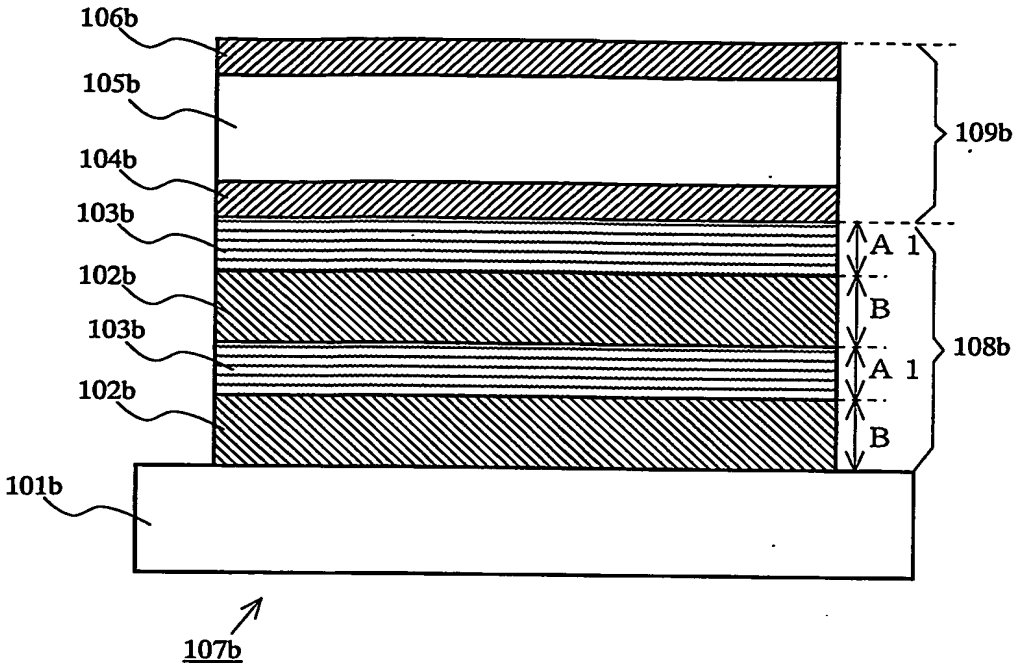

106b
105b
104b
103b
102b
103b
102b
101b
107b
109b
A 1
B
A 1
B
108b

FIG. 2

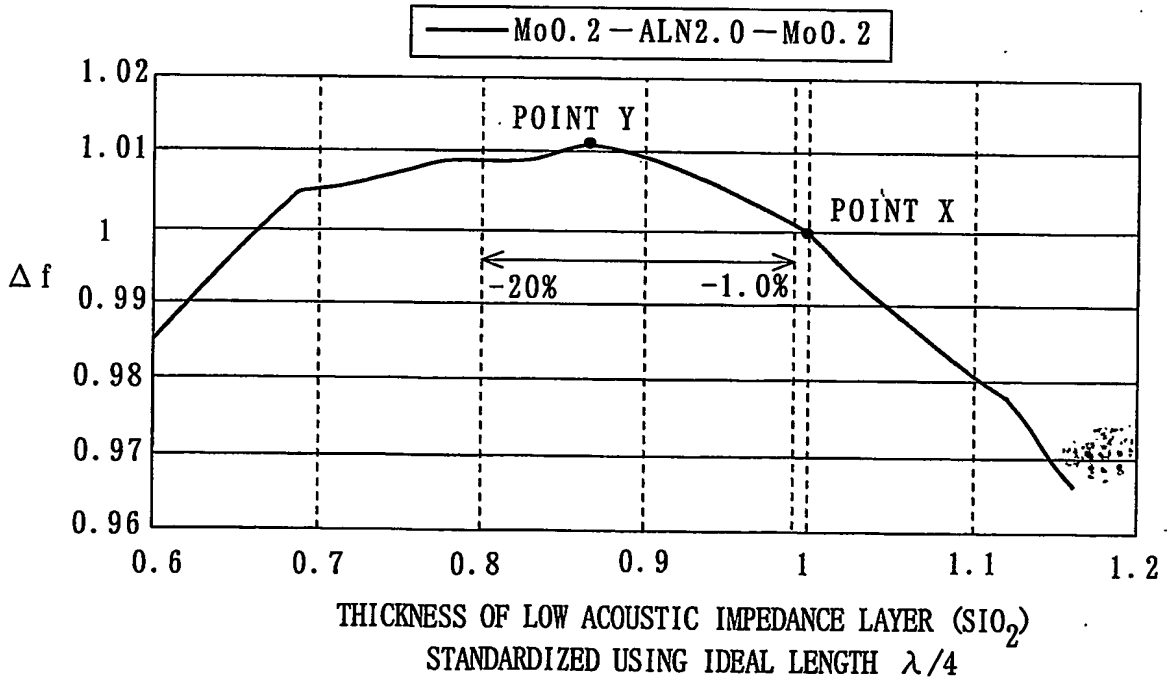

Mo0.2－ALN2.0－Mo0.2
1.02
1.01
1
0.99
0.98
0.97
0.96
Δf
POINT Y
POINT X
-20%
-1.0%
0.6
0.7
0.8
0.9
1
1.1
1.2
THICKNESS OF LOW ACOUSTIC IMPEDANCE LAYER (SiO_2)
STANDARDIZED USING IDEAL LENGTH λ/4

FIG. 3

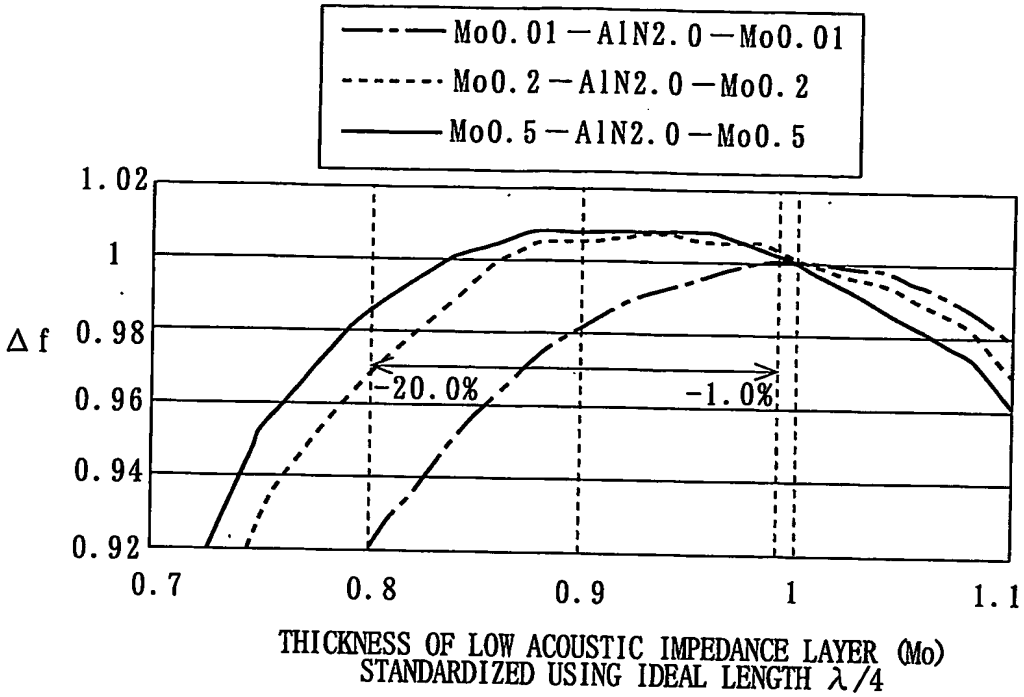

Mo0.01－AlN2.0－Mo0.01
Mo0.2－AlN2.0－Mo0.2
Mo0.5－AlN2.0－Mo0.5
1.02
1
0.98
0.96
0.94
0.92
Δf
-20.0%
-1.0%
0.7
0.8
0.9
1
1.1
THICKNESS OF LOW ACOUSTIC IMPEDANCE LAYER (Mo)
STANDARDIZED USING IDEAL LENGTH λ/4

FIG. 4

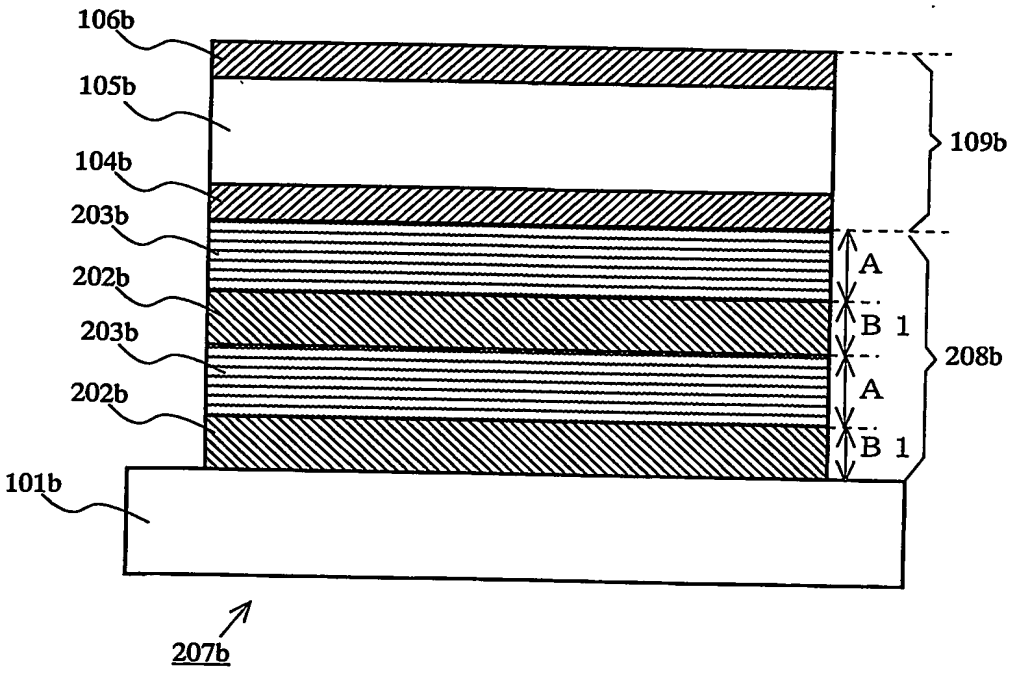

106b
105b
104b
203b
202b
203b
202b
101b
207b
109b
A
B 1
208b
A
B 1

FIG. 5

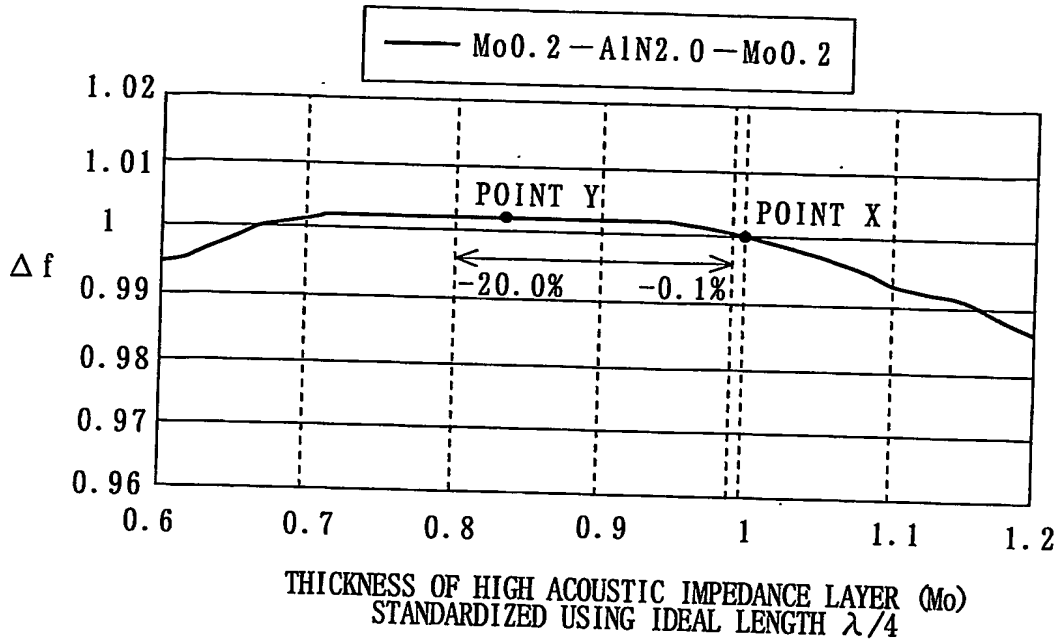

Mo0.2－AlN2.0－Mo0.2
1.02
1.01
1
0.99
0.98
0.97
0.96
Δf
POINT Y
POINT X
-20.0%
-0.1%
0.6
0.7
0.8
0.9
1
1.1
1.2
THICKNESS OF HIGH ACOUSTIC IMPEDANCE LAYER (Mo)
STANDARDIZED USING IDEAL LENGTH λ/4

FIG. 6

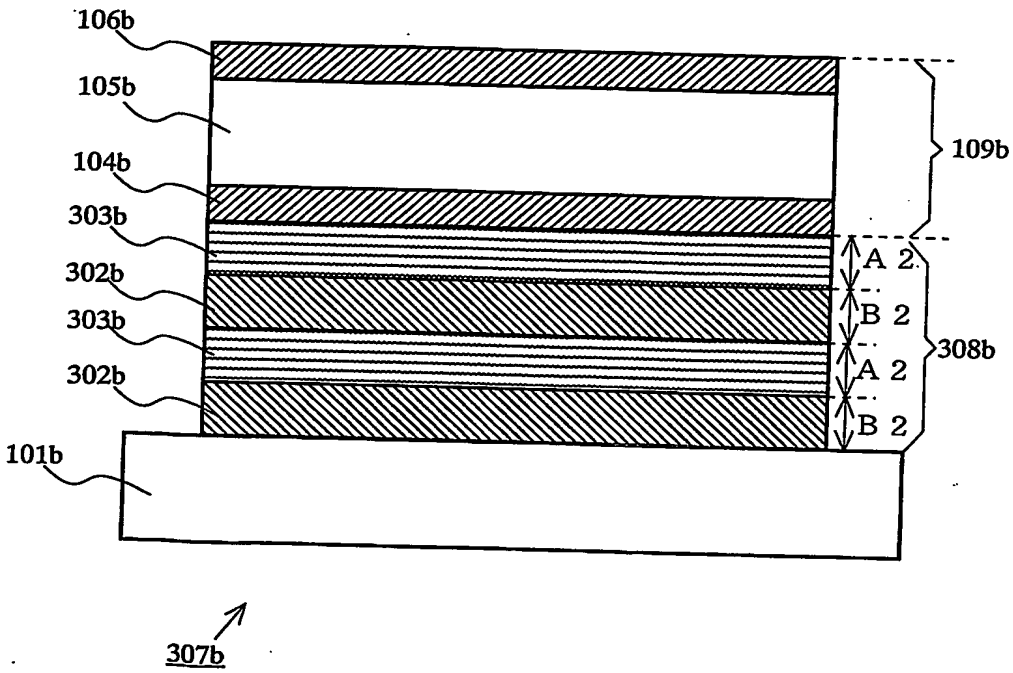
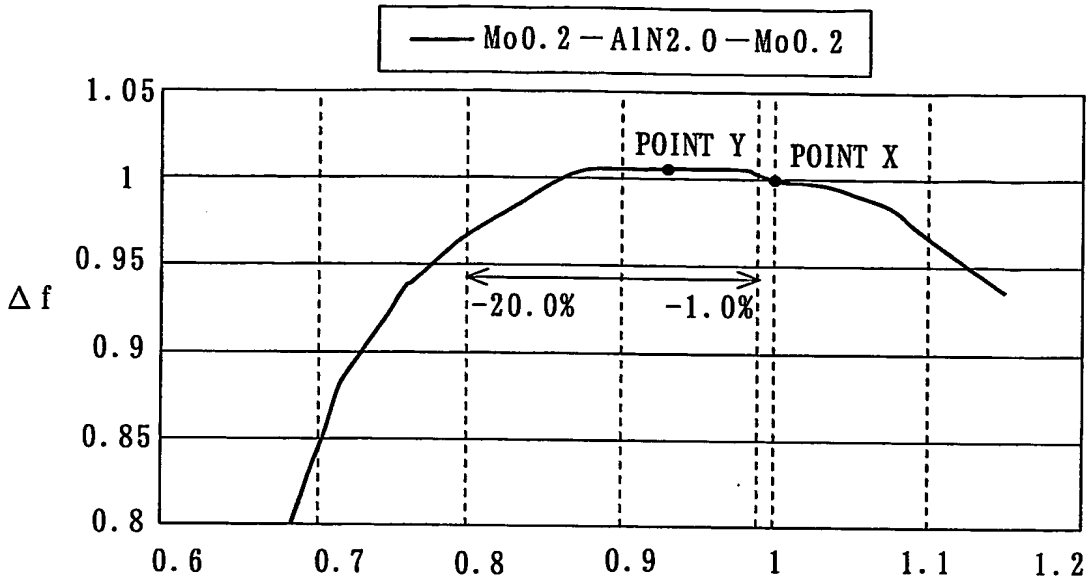
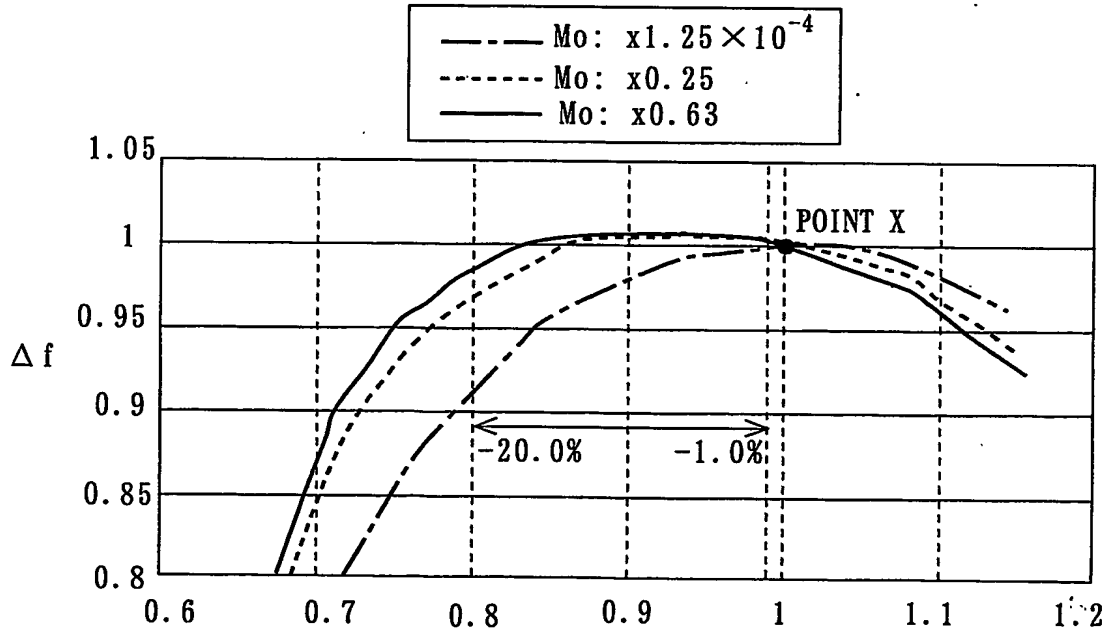

106b
105b
104b
303b
302b
303b
302b
101b
109b
A 2
B 2
A 2
B 2
308b
307b

FIG. 7



THICKNESSES OF HIGH AND LOW ACOUSTIC IMPEDANCE LAYERS STANDARDIZED USING IDEAL LENGTH λ/4

FIG. 8



THICKNESSES OF HIGH AND LOW ACOUSTIC IMPEDANCE LAYERS STANDARDIZED USING IDEAL LENGTH λ/4

FIG. 9

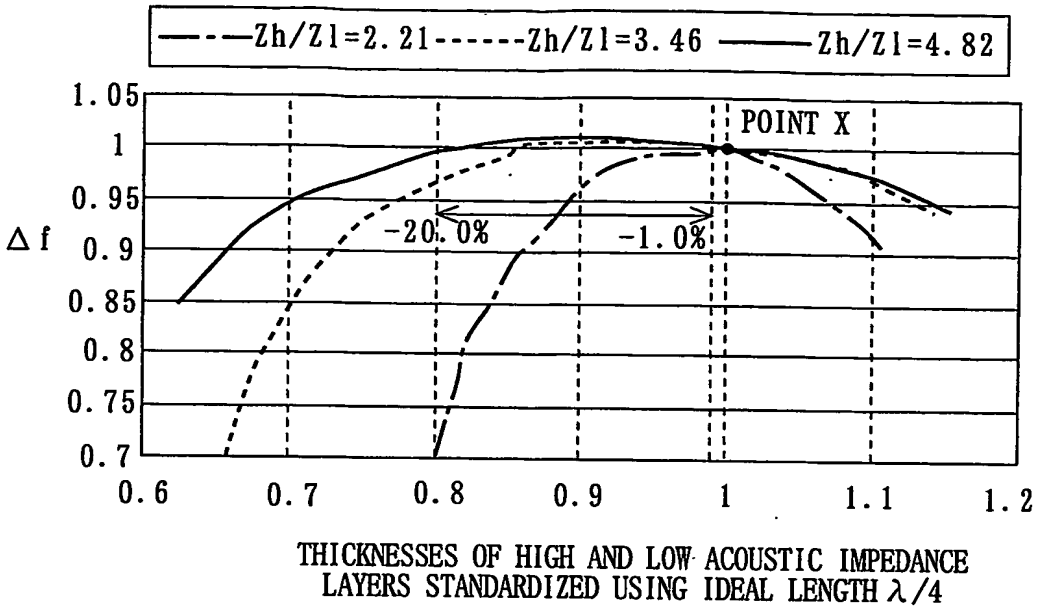

---Zh/Zl=2.21------Zh/Zl=3.46 ——Zh/Zl=4.82
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
Δf
POINT X
-20.0%
-1.0%
0.6
0.7
0.8
0.9
1
1.1
1.2
THICKNESSES OF HIGH AND LOW ACOUSTIC IMPEDANCE LAYERS STANDARDIZED USING IDEAL LENGTH λ/4

FIG. 10

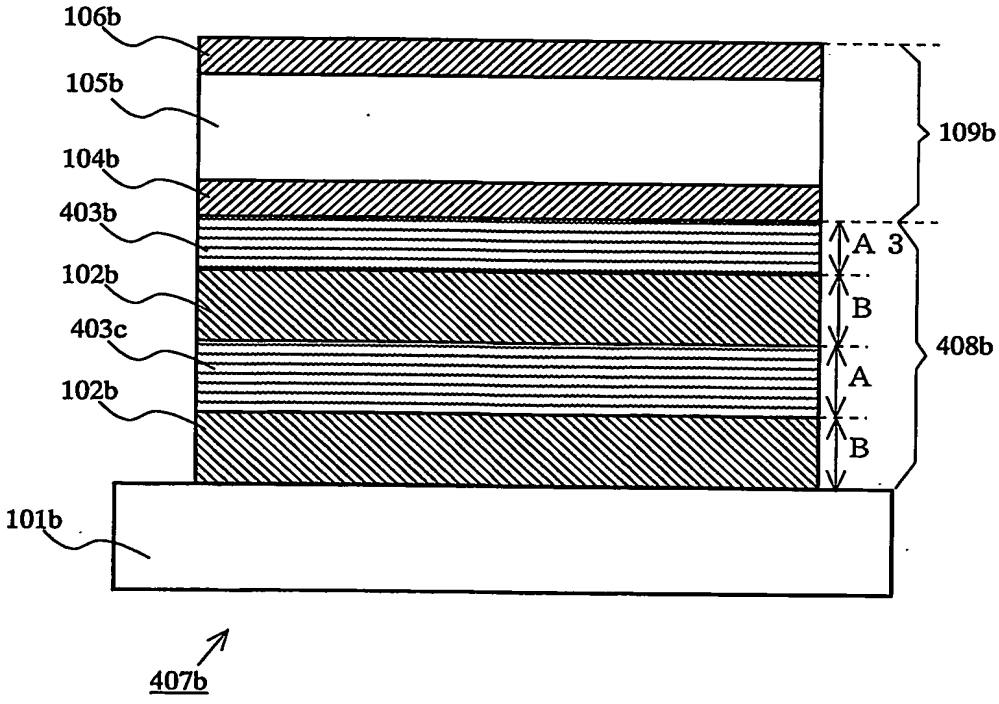

106b
105b
104b
403b
102b
403c
102b
101b
407b
109b
408b
A 3
B
A
B

FIG. 11

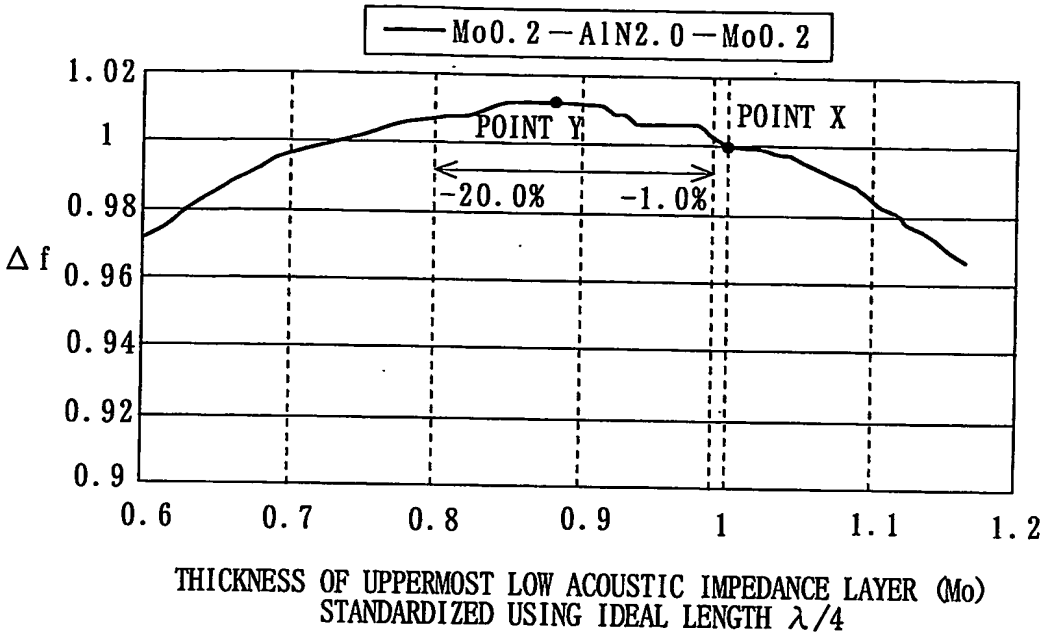

Mo0.2—AlN2.0—Mo0.2
1.02
1
0.98
0.96
0.94
0.92
0.9
Δf
POINT Y
POINT X
-20.0%
-1.0%
0.6
0.7
0.8
0.9
1
1.1
1.2
THICKNESS OF UPPERMOST LOW ACOUSTIC IMPEDANCE LAYER (Mo)
STANDARDIZED USING IDEAL LENGTH λ/4

FIG. 12

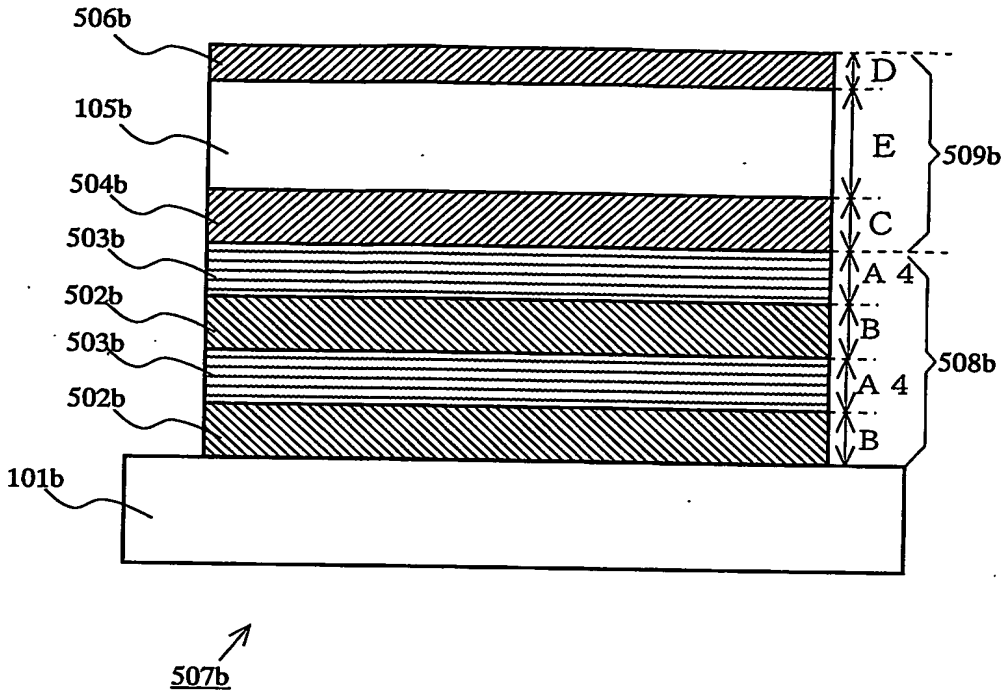

506b
105b
504b
503b
502b
503b
502b
101b
D
E
C
A 4
B
A 4
B
509b
508b
507b

FIG. 13

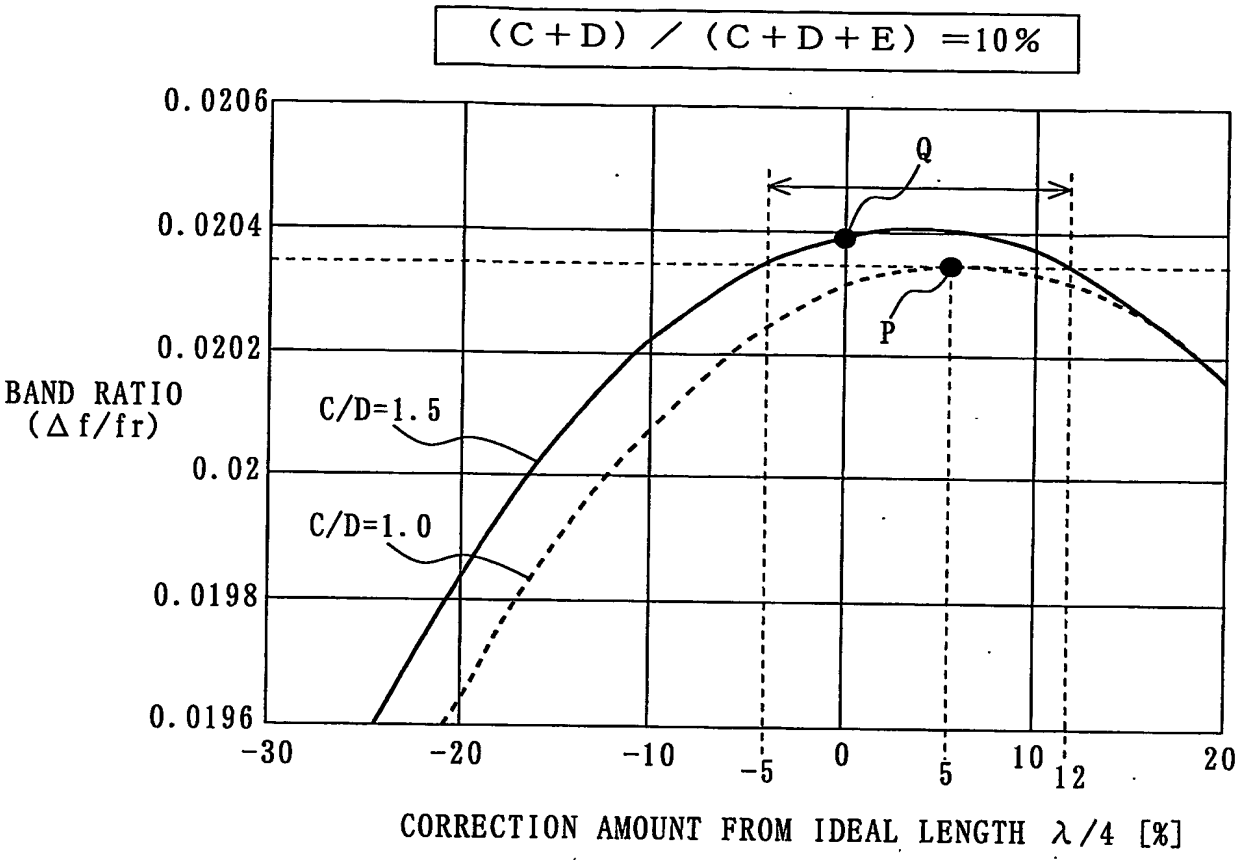

(C+D) / (C+D+E) =10%
0.0206
0.0204
0.0202
0.02
0.0198
0.0196
BAND RATIO
(Δf/fr)
C/D=1.5
C/D=1.0
Q
P
-30
-20
-10
-5
0
5
10
12
20
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 14

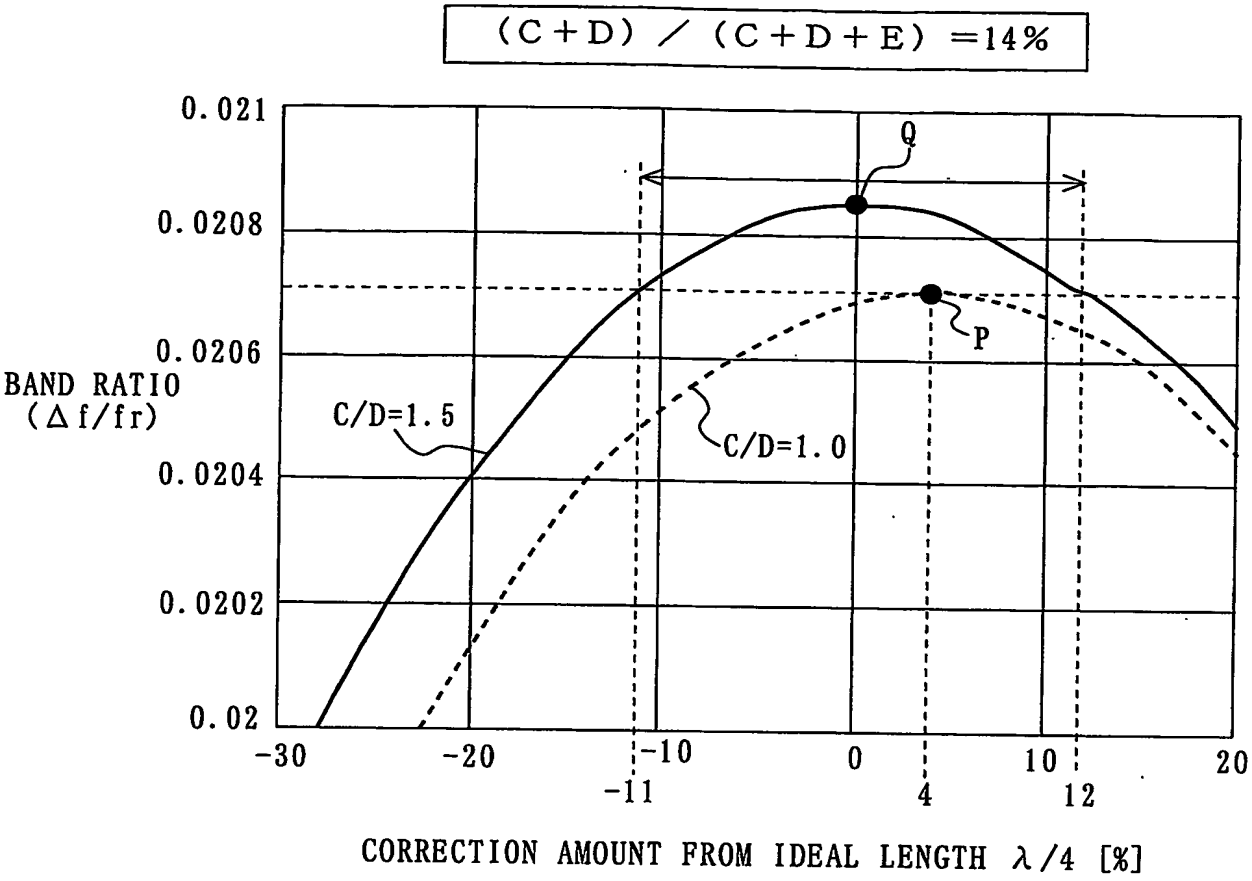

(C+D) / (C+D+E) =14%
0.021
0.0208
0.0206
0.0204
0.0202
0.02
BAND RATIO
(Δf/fr)
Q
P
C/D=1.5
C/D=1.0
-30
-20
-10
0
10
20
-11
4
12
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 15

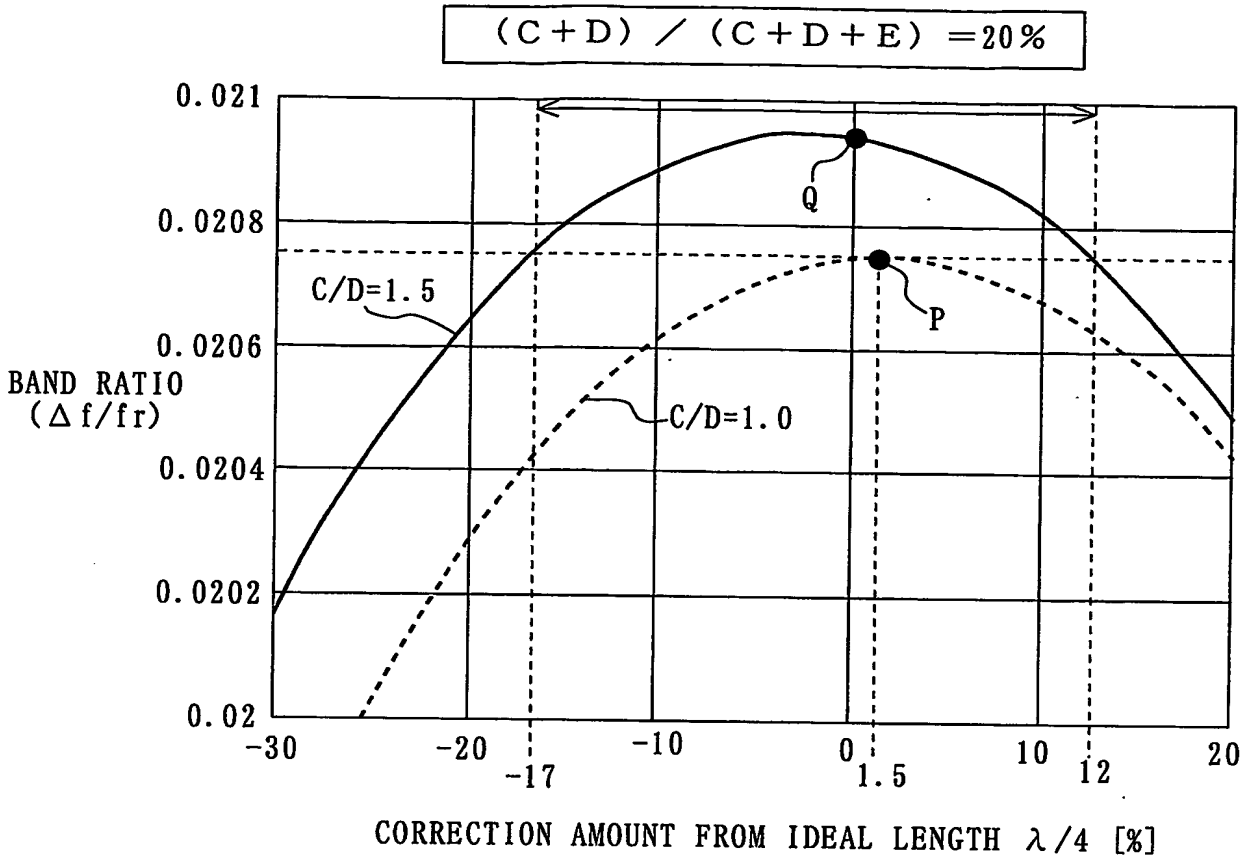

(C+D) / (C+D+E) =20%
0.021
0.0208
0.0206
0.0204
0.0202
0.02
BAND RATIO
(Δf/fr)
C/D=1.5
C/D=1.0
Q
P
-30
-20
-17
-10
0
1.5
10
12
20
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 16

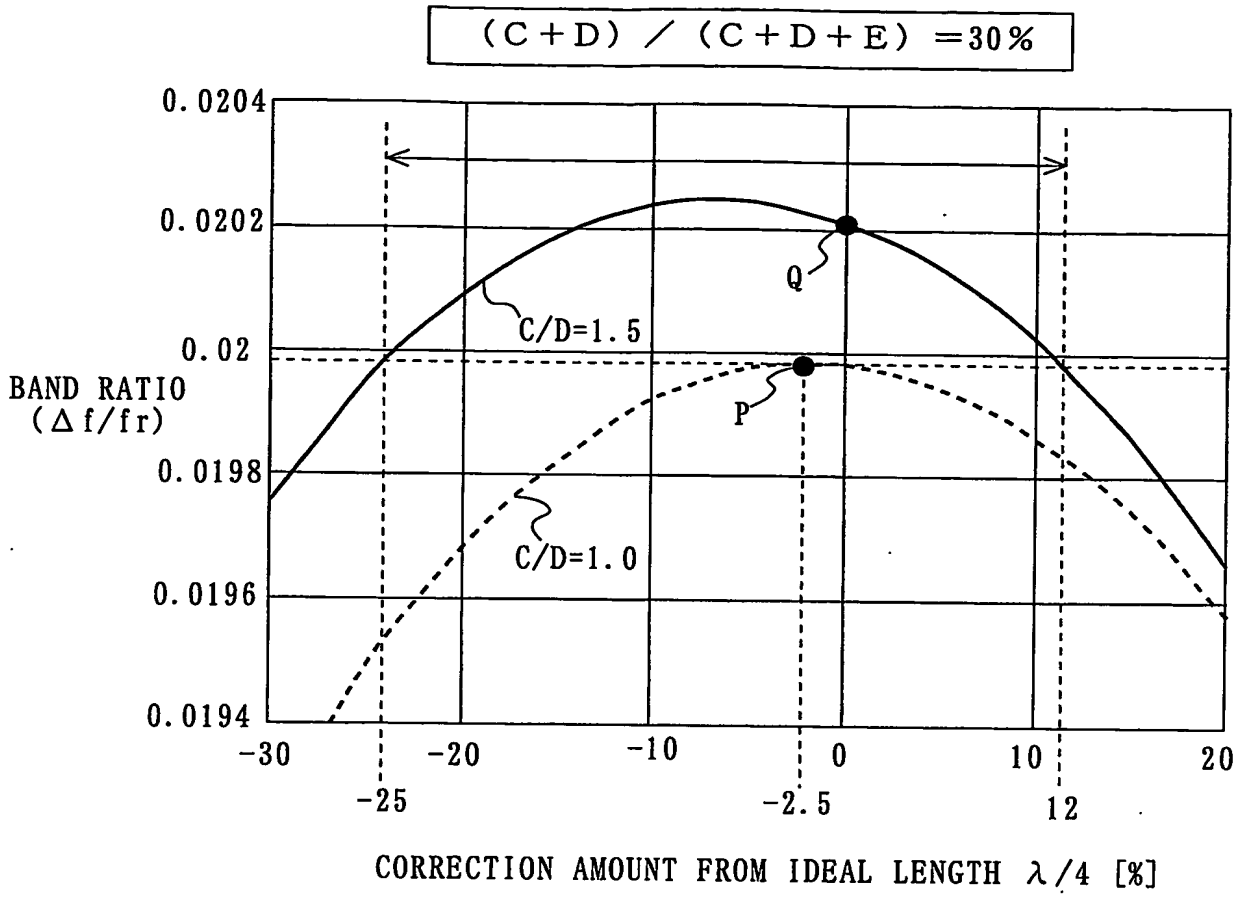

(C+D) / (C+D+E) =30%
0.0204
0.0202
0.02
0.0198
0.0196
0.0194
BAND RATIO
(Δf/fr)
Q
P
C/D=1.5
C/D=1.0
-30
-20
-10
0
10
20
-25
-2.5
12
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 17

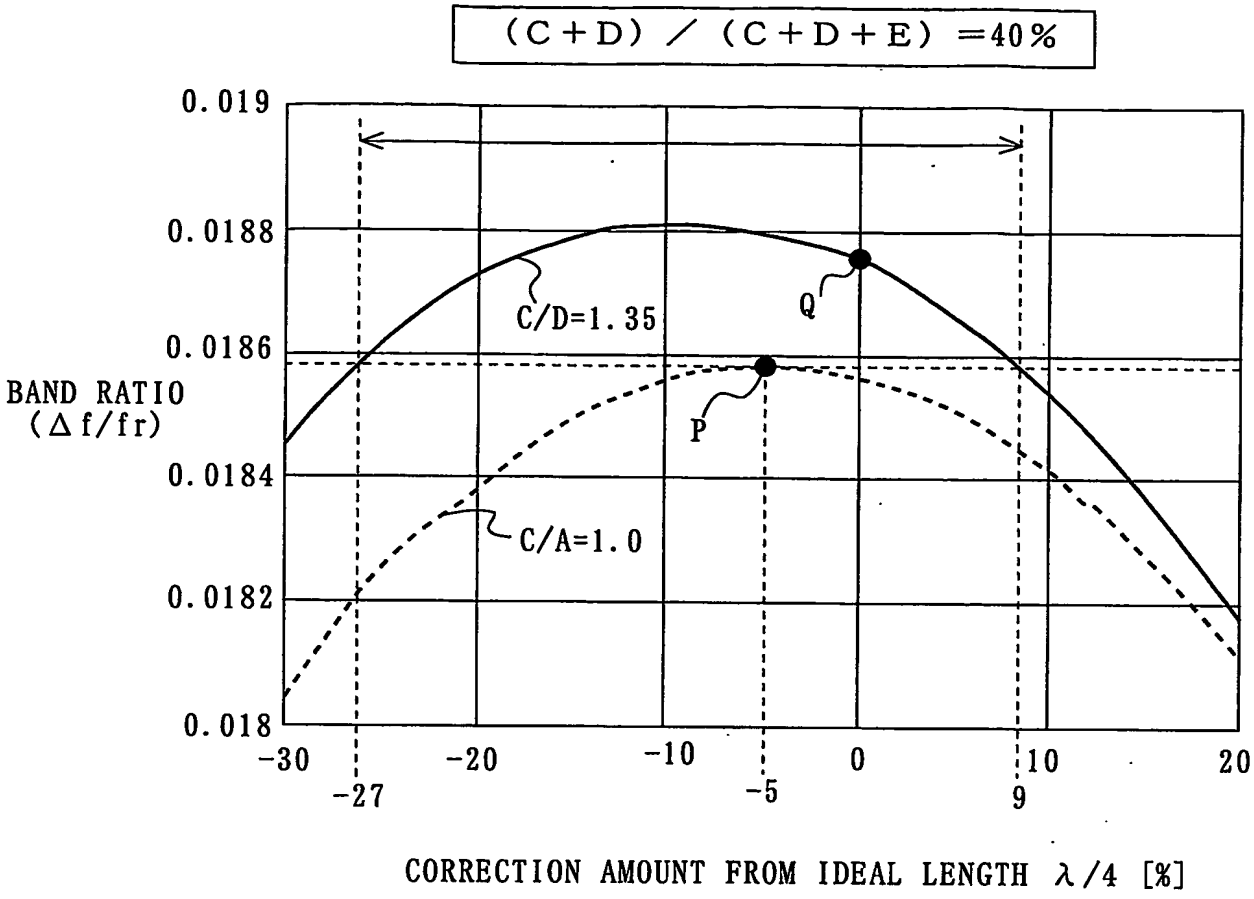

(C+D) / (C+D+E) =40%
0.019
0.0188
0.0186
0.0184
0.0182
0.018
BAND RATIO
(Δf/fr)
C/D=1.35
C/A=1.0
Q
P
-30
-20
-10
0
10
20
-27
-5
9
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 18

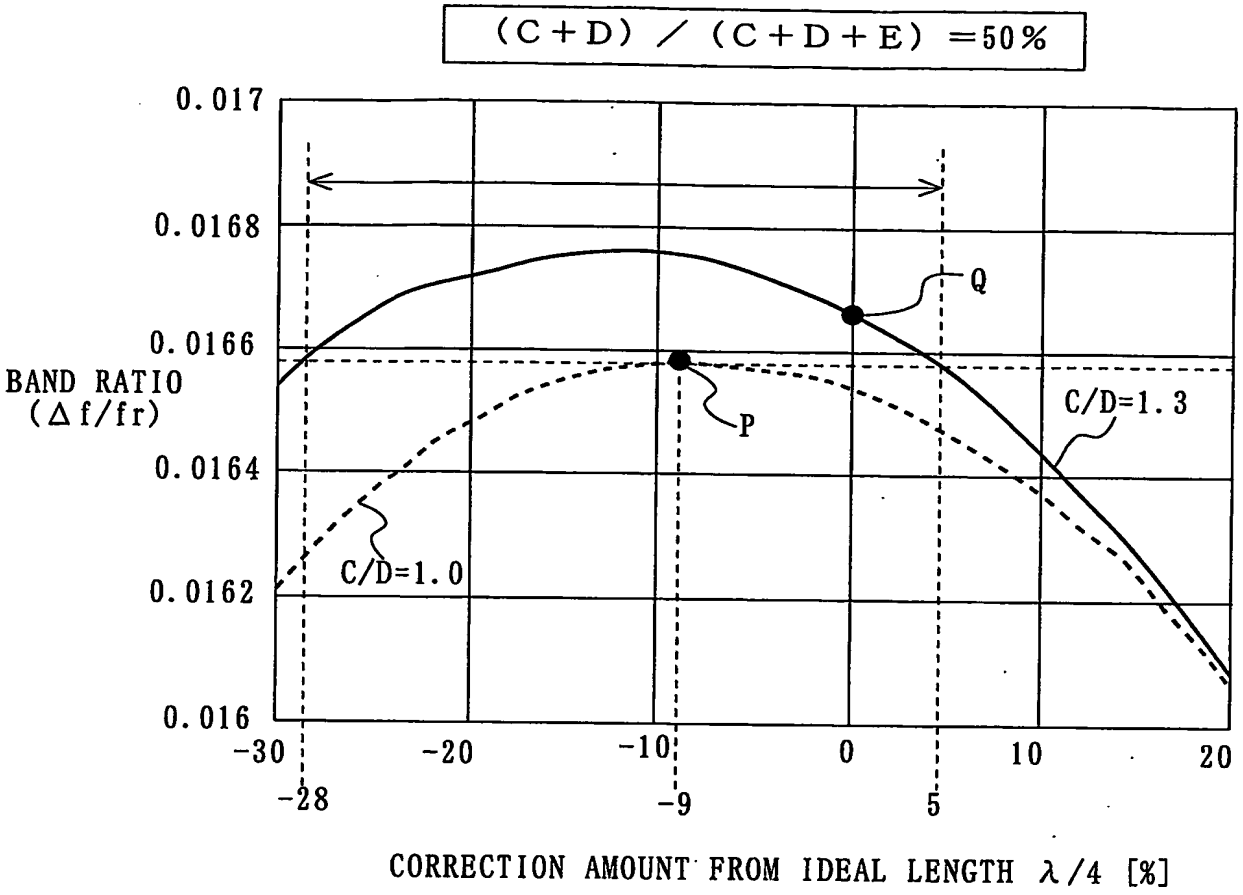

(C+D) / (C+D+E) =50%
0.017
0.0168
0.0166
0.0164
0.0162
0.016
BAND RATIO
(Δf/fr)
Q
P
C/D=1.3
C/D=1.0
-30
-20
-10
0
10
20
-28
-9
5
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 19

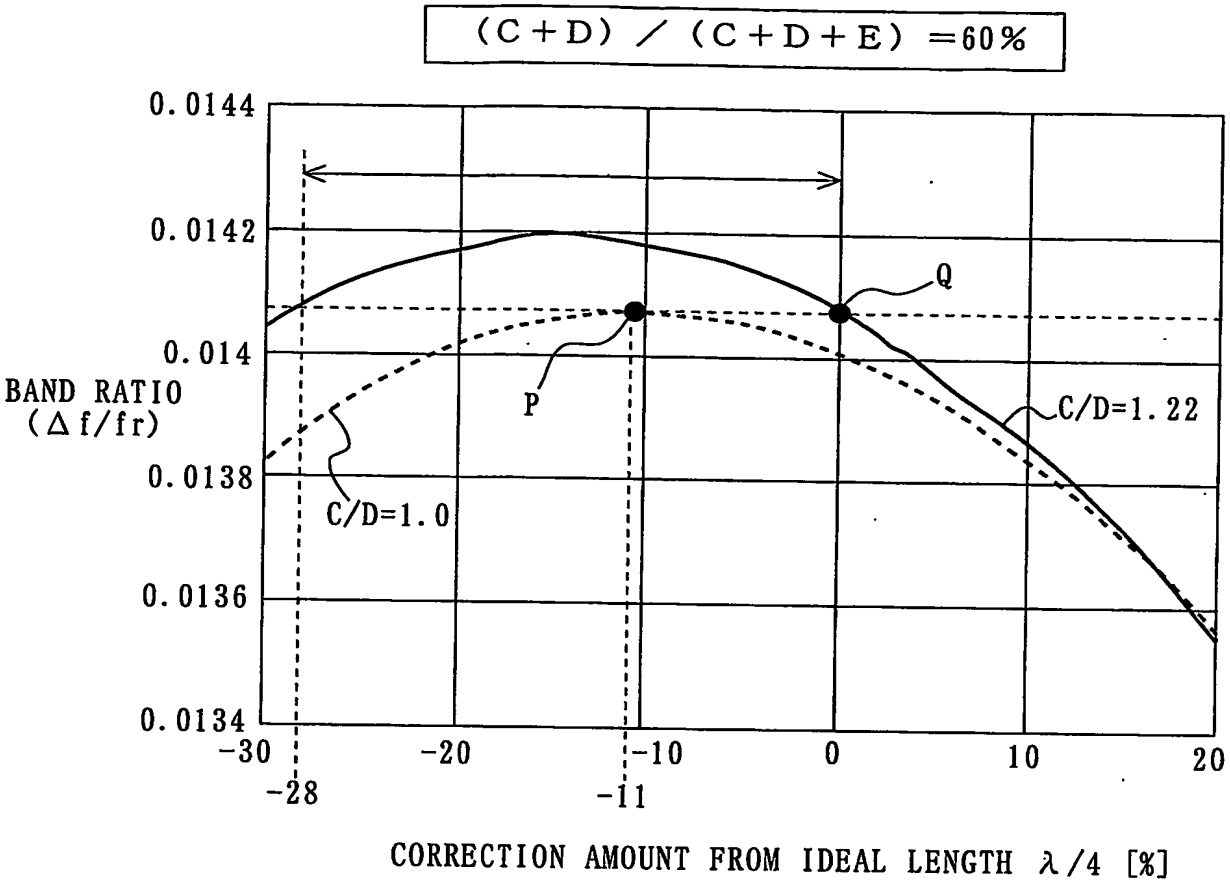

(C+D) / (C+D+E) =60%
0.0144
0.0142
0.014
0.0138
0.0136
0.0134
BAND RATIO
(Δf/fr)
Q
P
C/D=1.22
C/D=1.0
-30
-20
-10
0
10
20
-28
-11
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 20

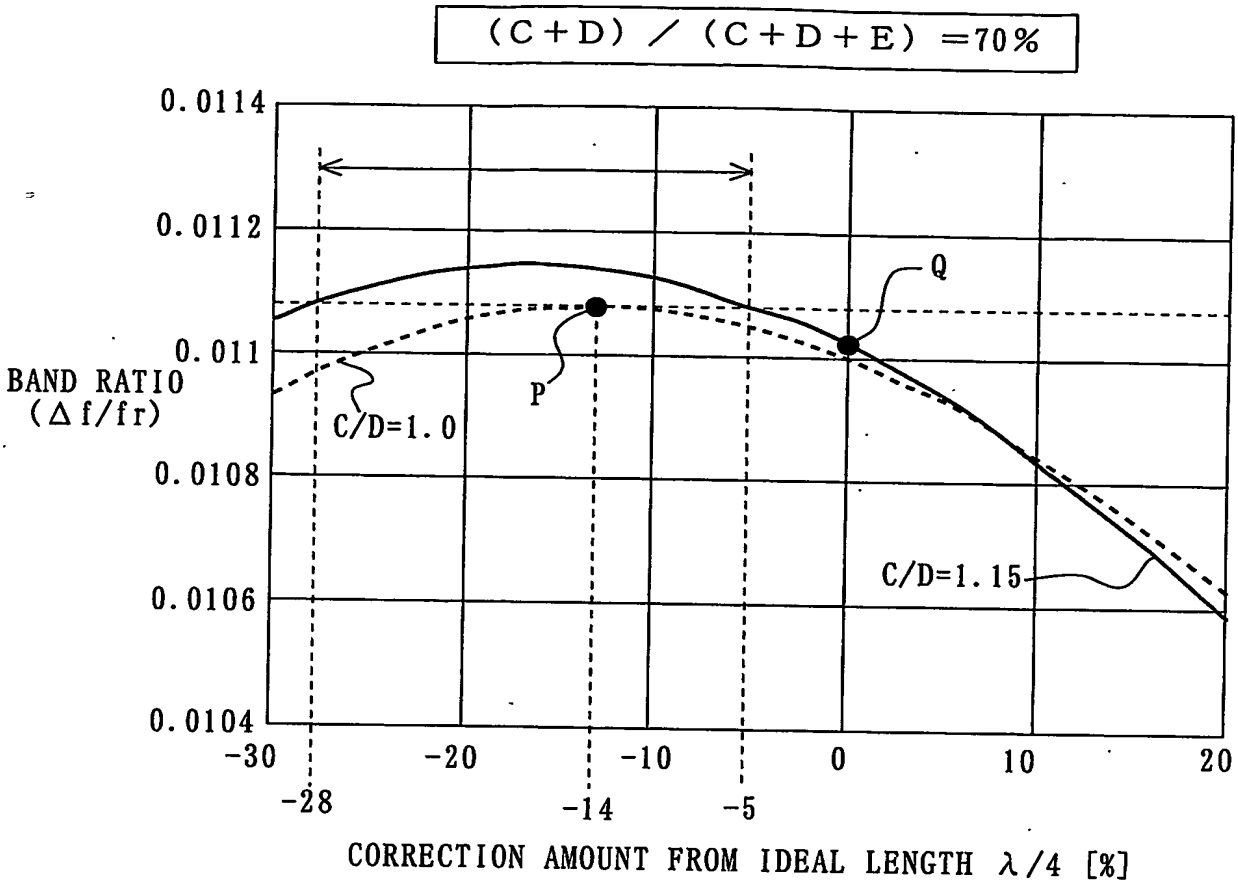

(C+D) / (C+D+E) =70%
0.0114
0.0112
0.011
0.0108
0.0106
0.0104
BAND RATIO
(Δf/fr)
C/D=1.0
P
Q
C/D=1.15
-30
-20
-10
0
10
20
-28
-14
-5
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 21

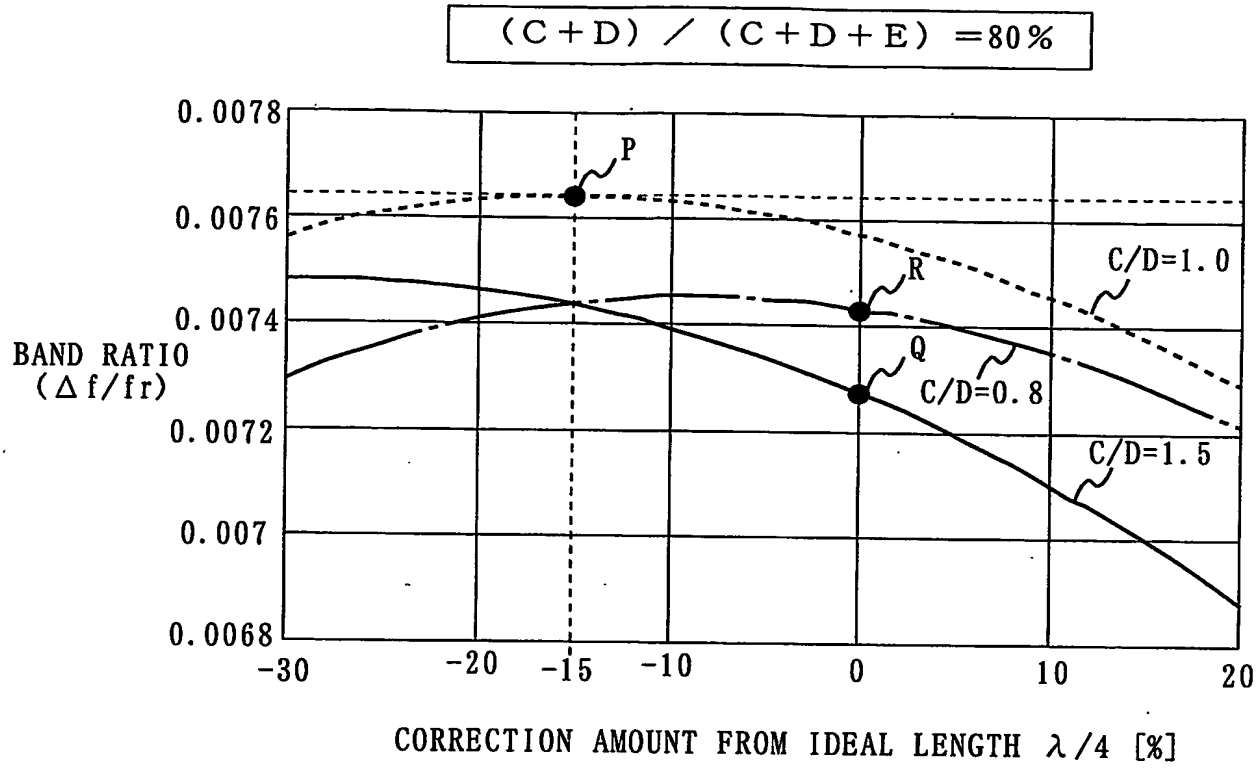

(C+D) / (C+D+E) =80%
0.0078
0.0076
0.0074
0.0072
0.007
0.0068
BAND RATIO
(Δf/fr)
P
R
Q
C/D=1.0
C/D=0.8
C/D=1.5
-30
-20
-15
-10
0
10
20
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 22

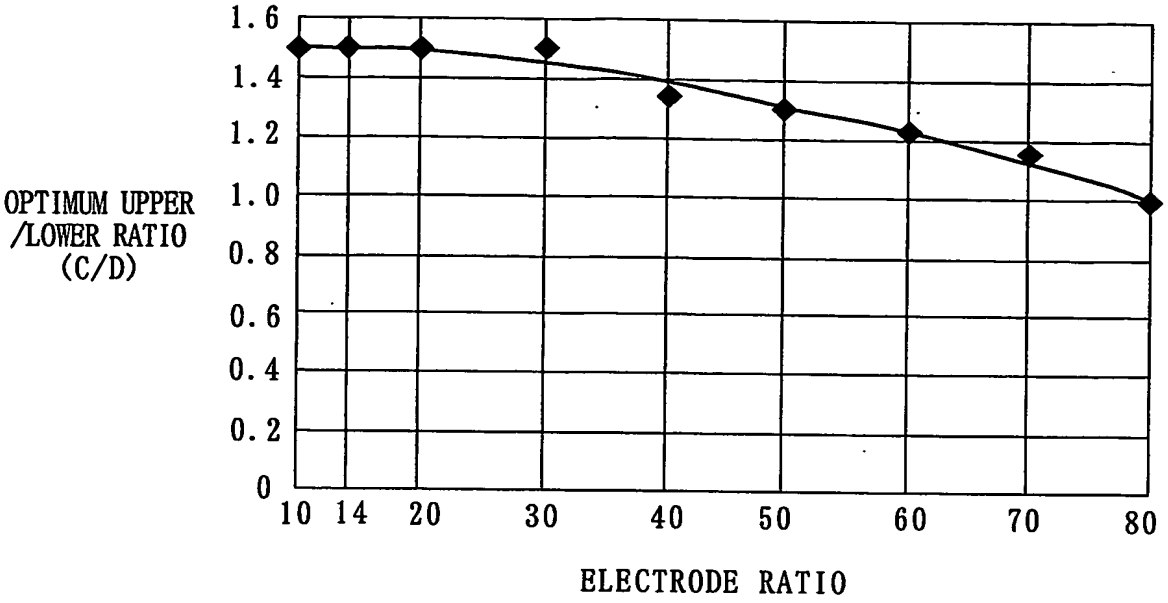

OPTIMUM UPPER /LOWER RATIO (C/D)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
10
14
20
30
40
50
60
70
80
ELECTRODE RATIO

FIG. 23

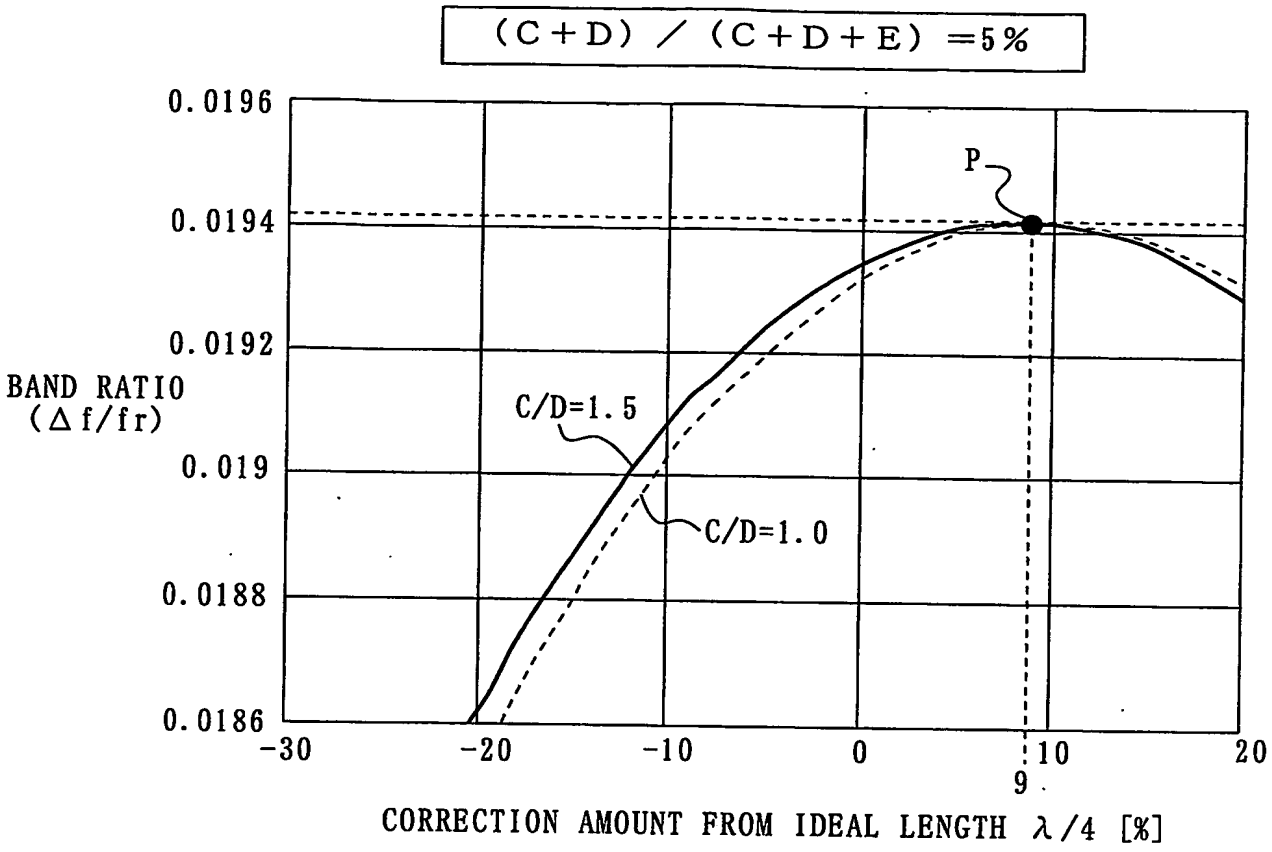

(C+D) / (C+D+E) =5%
0.0196
0.0194
0.0192
0.019
0.0188
0.0186
BAND RATIO
(Δf/fr)
P
C/D=1.5
C/D=1.0
-30
-20
-10
0
10
20
9
CORRECTION AMOUNT FROM IDEAL LENGTH λ/4 [%]

FIG. 24A

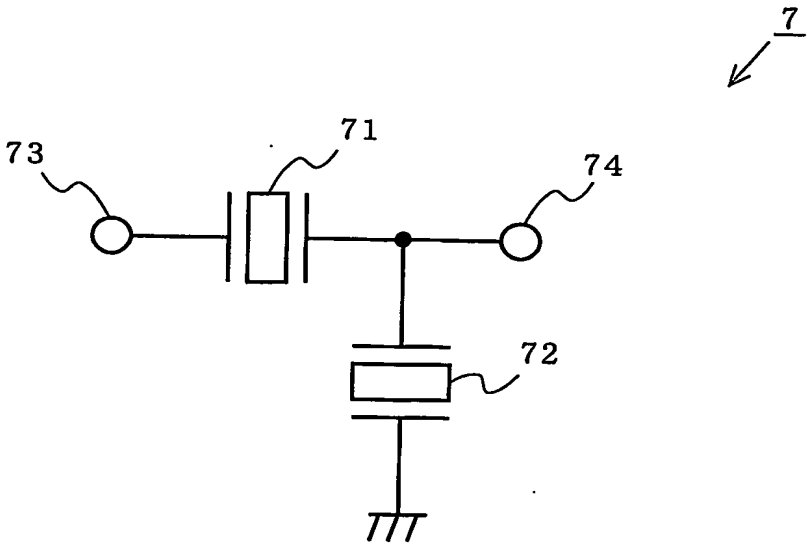


FIG. 24B

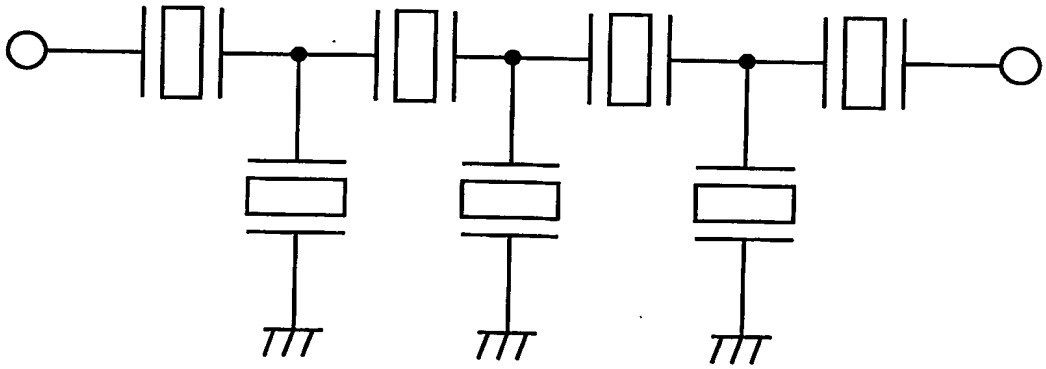


FIG. 25

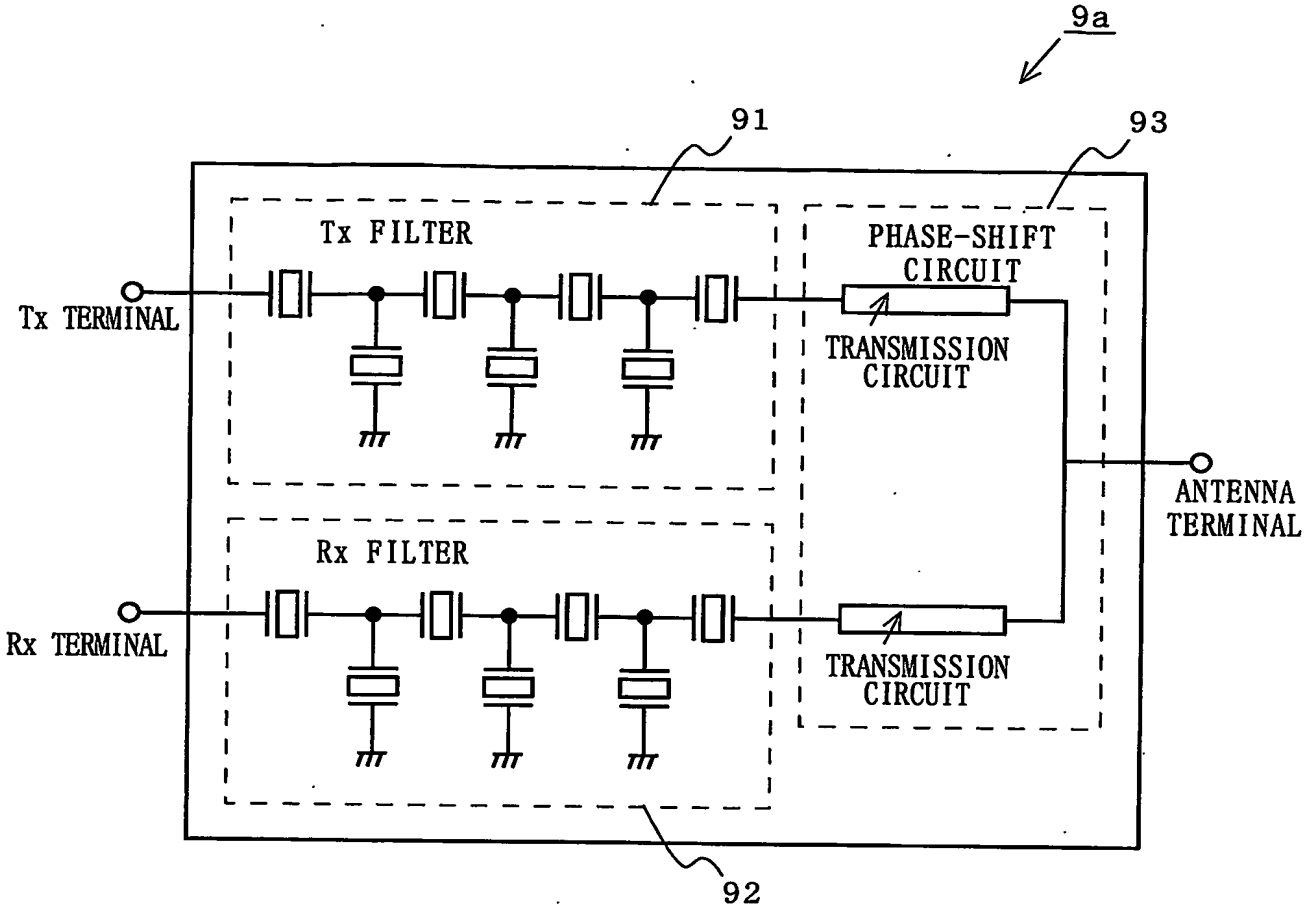

9a
91
93
Tx FILTER
PHASE-SHIFT CIRCUIT
Tx TERMINAL
TRANSMISSION CIRCUIT
ANTENNA TERMINAL
Rx FILTER
Rx TERMINAL
TRANSMISSION CIRCUIT
92

FIG. 26

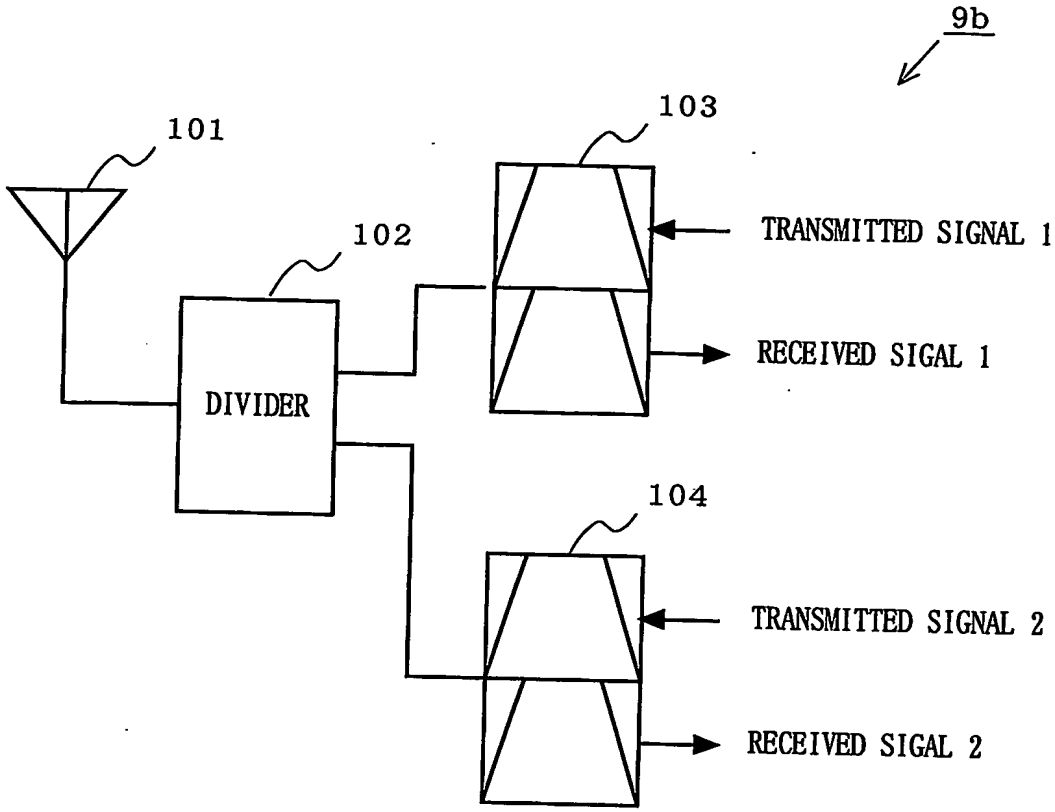

9b
101
102
103
104
DIVIDER
TRANSMITTED SIGNAL 1
RECEIVED SIGAL 1
TRANSMITTED SIGNAL 2
RECEIVED SIGAL 2

FIG. 27

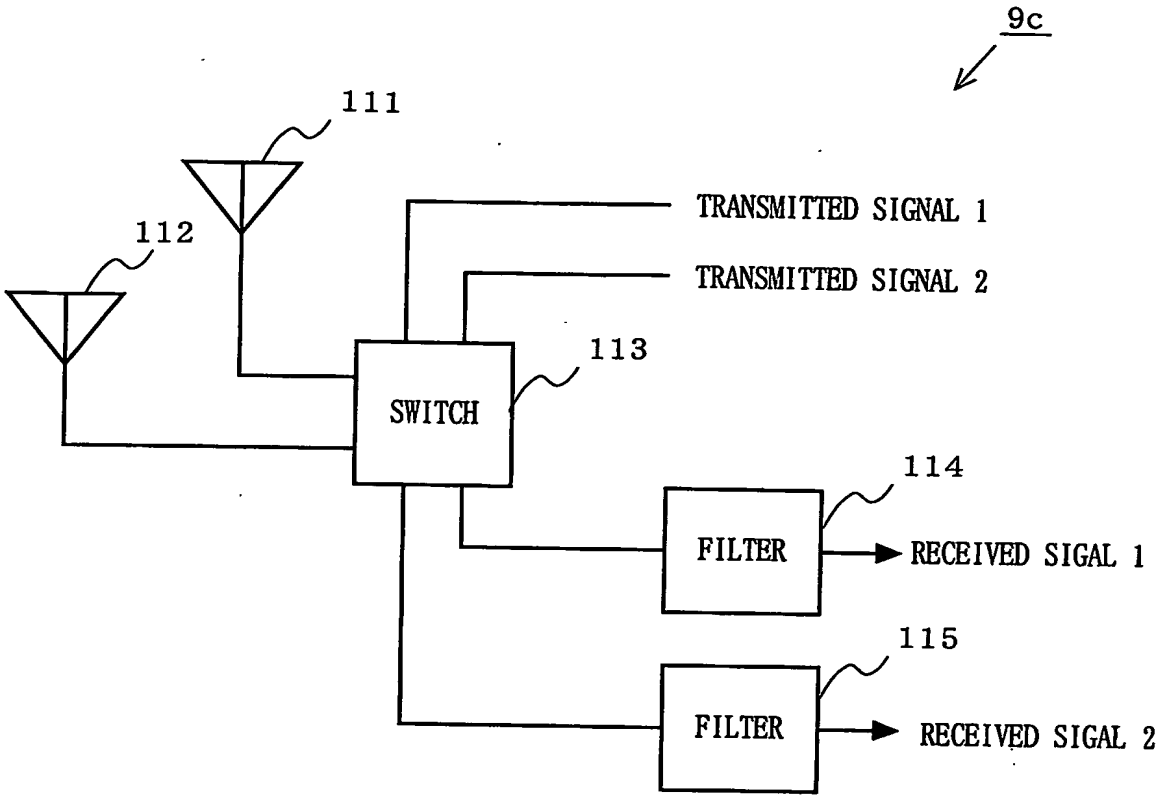

9c
111
112
TRANSMITTED SIGNAL 1
TRANSMITTED SIGNAL 2
113
SWITCH
114
FILTER
RECEIVED SIGAL 1
115
FILTER
RECEIVED SIGAL 2

FIG. 28

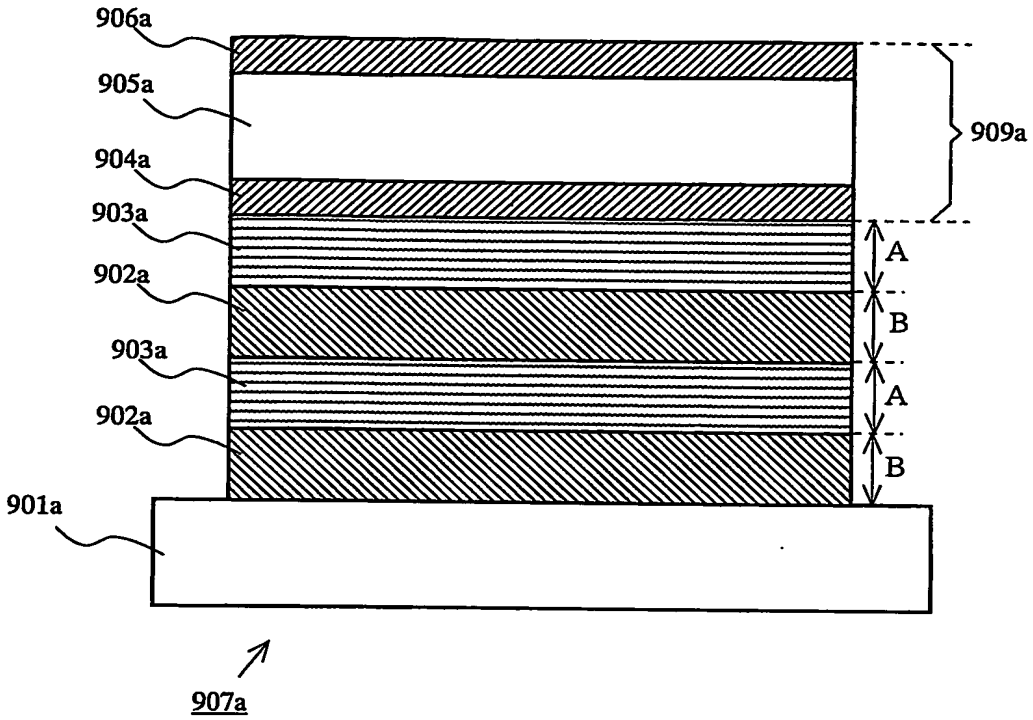
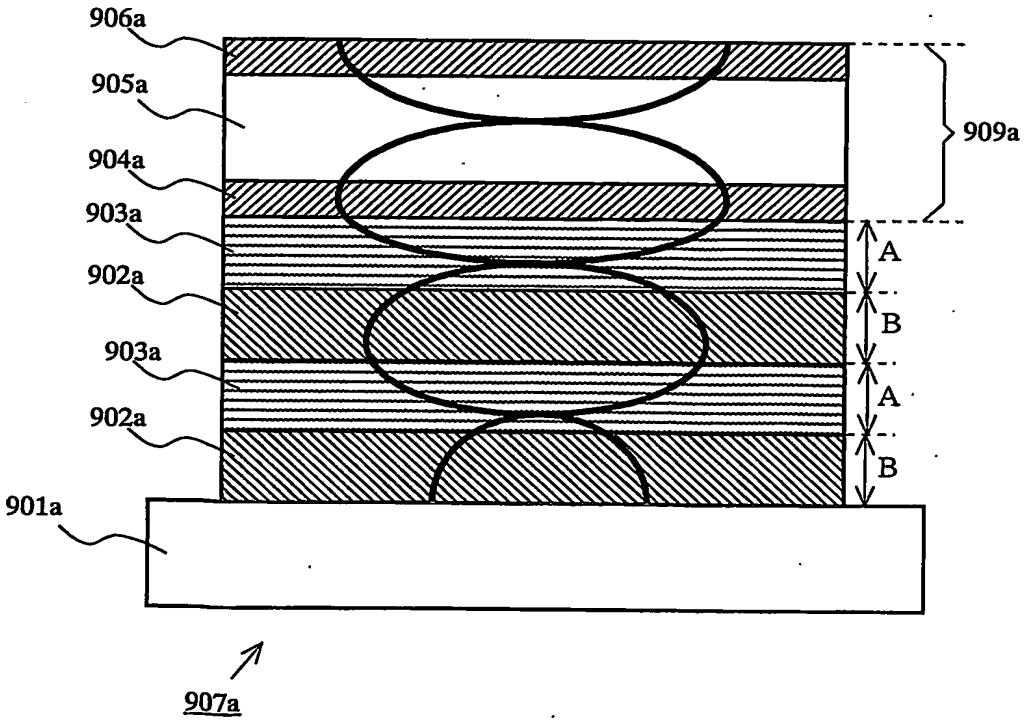

906a
905a
904a
903a
902a
903a
902a
901a
909a
A
B
A
B
907a

FIG. 29


906a
905a
904a
903a
902a
903a
902a
901a
909a
A
B
A
B
907a